Phytochemical Analysis and Antibacterial Activities of *Combretum Molle* Stem Bark Extract for Management of Respiratory Tract Infections

BY

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Declaration

I, Kampi Maria Gorret, declare that the research dissertation is my own original work otherwise cited, and where such has been the case, references have been stated and that the same work has not been submitted for any award in any other university or other tertiary institute of higher education

Signature..... Date..24/05/23.....

Approval

This research review has been submitted for examination and has been approved by my supervisor.

Dr. Owor Richard Oriko

Signature..... Date..24/05/23.....

Dedication

This report is dedicated to my parents and grandparents Ms. Kadondo Robinah and Mr. Mugabi Edward, my siblings Waiswa Micheal Mugabi, Kafuko Phillip, Mugabi David and Mpatogera Gertrude and my uncles Mr. Byakika Emmanuel Paddy, Mr. Kafuko Mosses, Mr. Ntabewra Hebert and Mr. Ibale Stephen Richard who have supported me in all aspects of life in my entire life journey of pursing my career dream as a professional teacher.

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Abstract

Respiratory tract infections affect both the upper and lower respiratory parts of the respiratory system. It's caused by the bacterium called *Streptococcus pneumoniae.* 9 million Ugandans are reported to have symptoms of respiratory tract infections after every two weeks in the primary health care centres and over 2 million people die each year. Traditionalists and herbalists in Uganda have adapted to using *Combretum molle* regulate the cases of respiratory tract infections. Therefore, this Study was to investigate the phytochemical composition of *C.molle* for antibacterial activities, analyze the phytochemical composition of *C.molle* and to evaluate the efficacy of *C.molle* stem back extract against antibacterial activities. The crude extract of *C.molle* was subjected to preliminary phytochemical screening and antimicrobial tests. The phytochemical tests were carried out using standard methods of analysis and these investigations revealed the presence of alkaloids, flavonoids, phenols, Quinones, tannins, Saponins and Glycosides while terpenoids and steroids were not present in the crude extract. An herbal syrup was formulated and named CODEM 40. This could top to greater protection and assistance to people in managing respiratory tract infections. Therefore, additional studies and elucidation of the active compounds so as to provide a new or principal component for production of new drugs can be opened up further studies to investigate the toxicity of *C.molle* herbal products before their recommendation for use.

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List of Acronyms

C.molle; Combretum Molle

S. pneumoniae: Streptococcus pneumoniae

WHO; world health organization

CMS; Carboxymethyl Cellulose

RTIs; Respiratory Tract Infections

HCl; Hydrochloric acid

AQ; Aqueous extract

OE; Organic extract

DNA; Deoxyribose Nucleic Acid

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CHAPTER ONE: INTRODUCTION

1.1 Background

Respiratory tract infections (RTIs) are diseases associated with fever, sore throat, blocked nose, cough, colds, malaise and running nose. It is always caused either viruses like *Rhinovirus* and *Corona* virus or bacteria like *Streptococcus*, *Staphylococcus* and *Moraxella* (Chrian, Erasto, & Otieno, 2011). Globally, *Streptococcus* and *Staphylococcus* are the commonest bacteria that cause the majority of respiratory tract infections (Wiemken, Peyrani, & Ramirez, 2012).

A respiratory tract infection is one of the diseases that report the biggest number of patients in primary health care centers of Uganda. The commonest that affects the populations include pneumonia, asthma, and tuberculosis. These mainly affect extreme ages that is to say very young and very old (Wiemken et al., 2012). In Uganda, over 9 million people are infected by respiratory tract infections with about 2 million deaths every year. The majority of these infections occur in low income countries where the increased cases of infections are attributed to inaccessibility to immunization, medication and inability of health care systems to provide care thus leading to avoidable death (Boloursaz et al., 2013). In Uganda, 3 million infants (< 5 years) have been identified to be victims of respiratory tract infections every year (Kiguli et al., 2021). Entirely about 9 million Ugandans are reported to have symptoms of RTIs after every two weeks in the primary health care centres and over 2 million people die each year (Erku & Aberra, 2018).
There are numerous drugs prescribed for management of respiratory tract infections and they are in category of analgesics (paracetamol and ibuprofen), antihistamine (diphenhydramine), antibiotics (penicillin and amoxicillin) and anticholinergics (ipratropium and scopolamine) (WHO, 2001). In spite of the present drugs, RTIs cases are still in increase (Schuetz et al., 2013) For example in Uganda, there were 19 millions Ugandans suffering from respiratory tract infections in 2020, 18millions in 2021, 20millions in 2022. This is has contributed to COVID-19 (Vihta et al., 2022)

The surge up of the many victims suffering from RTIs is linked to resistance of the pathogens the available drugs (Cimolai, 2021).The cumulative rates of antibiotic resistance in community pathogens have focused the attention of researchers and clinicians on this public health problem(Ferri, Ranucci, Romagnoli, & Giaccone, 2017). There has been resistance to penicillin in

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